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Room-temperature mechanochemical preparation and electrochemistry properties of polyoxometalate-based inorganic-organic hybrid

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Abstract

Based on the Keggin-type silicotungstic acid and thiourea, a new inorganic-organic hybrid with lamellar shape has been synthesized by a mechanochemical route at room temperature. The heteropolyanions still retained the Keggin-type structure in the hybrid. It was designed as a carbon paste electrode to investigate its electrochemical properties. The sample shows the characteristic electrochemical properties of Keggin-type polyanions, holding three couples of stable and reversible redox peaks in the range of -0.15~-0.73 V, which may arise from the maintenance of Keggin-type polyanions and the pore structure of lamina. This work proposed a new synthetic route for polyoxometalates-based hybrid, and offered an effective method to investigate the property of polyoxometalate-based hybrid under the solid state condition.

Keywords: Polyoxometalates; Mechanochemical synthesis; Room temperature; Carbon paste electrode; Electrochemistry

1. Introduction

As one of metal oxide clusters with nanosizes and abundant topologies, polyoxometalates (POMs) have been employed as inorganic building blocks for the construction of the functional solid materials [1], especially the metal organic framework (MOF) structure [2]. A number of studies have shown that POM-based hybrids possess some active physical and chemical properties, such as photochemical,

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